

We Claim:

1. A method of separating a one or more compounds from a solution by crystallization, where the solution exhibits at least a ternary phase equilibrium relationship which is represented by at least a ternary phase diagram, comprising the
5 steps of:
 - providing the solution comprised of at least three components in phase equilibrium, including one or more compound components and a solvent component, and where the compound components may form an adduct, and where the solvent component is comprised of two or more solvents, including at least a first solvent exhibiting a first
10 phase behavior, and at least a second solvent exhibiting a second phase behavior;
 - where the at least three components in phase equilibrium exhibit phase behavior which establishes at least two compartments in the phase diagram, including an adduct compartment and at least one pure solid compound compartment;
 - manipulating the area of the adduct and pure solid compound compartments by
15 adjusting the concentration ratio of the two or more solvents;
 - adjusting the composition of the solution prior to crystallization to place the solution concentration at a location selectively within a desired compartment; and
 - crystallizing the solution to form a solid compound, as selected.
2. The method of claim 2 wherein adjusting the composition of the solution
20 includes adding to, and/or removing from, the solution any one or more the components.

3. A method of separating a solid product from a solution including a compound in a process operation, and where the product and compound may form an adduct, characterized in that:

at least two solvents are provided in the solution, at least a first solvent exhibiting
5 a high solubility for the product and at least a second solvent exhibiting a low solubility for the product, and the concentration of the solvents are selectively controlled such that the solid product is formed from the solution at selected process operating conditions.

4. The method of claim 4 wherein a concentration ratio of the two solvents is adjusted to selectively form either substantially pure solid product or the adduct.

10 5. The method of claim 4 wherein the at least two solvents, product and compound exhibit a ternary phase equilibrium relationship, and the composition of the solution is selectively adjusted such that the solution falls within a selected region of the ternary phase equilibrium relationship.

6. A method of forming a solid product in a reaction process, comprising the
15 steps of:

reacting reactants to form a solution including at least a compound and a product, where the compound and product may form an adduct;

adjusting the composition of the solution to include two or more solvents; and

separating solid product from the solution by selectively controlling a
20 concentration ratio of the two or more solvents, where the two or more solvents are comprised of at least a first solvent exhibiting a high solubility for the product and at least

a second solvent exhibiting a low solubility for the product, such that the solid product is formed.

7. The method of claim 7 wherein the concentration ratio of the two or more solvents is adjusted to selectively form either substantially pure solid product or the
5 adduct.

8. The method of claim 7 where the step of adjusting the composition of the solution includes adding to, and/or removing from, the solution any one or more of the two solvents or compound.

9. A method of separating one or more solid compounds from a solution
10 including one or more components in a process operation, and where the one or more components may form at least one adduct, characterized in that: at least two solvents are provided in the solution, at least a first solvent exhibiting a first phase behavior and at least a second solvent exhibiting a second phase behavior, and the concentration of the solvents are selectively controlled such that a solid compound is formed from the solution
15 at selected process operating conditions.

10. A method of separating a compounds from a solution by crystallization, where the solution exhibits at least a ternary phase equilibrium relationship which is represented by at least a ternary phase diagram, comprising the steps of:

providing the solution comprised of at least three components in phase equilibrium, including one or more compound components and a solvent component, and where the compound components may form an adduct,;

- where the at least three components in phase equilibrium exhibit phase behavior
- 5 which establishes at least two compartments in the phase diagram, including an adduct compartment and at least one pure solid compound compartment;

manipulating the area of the adduct and pure solid compound compartments by adjusting the concentration of the solvent in the solution such that pure solid compound is formed by crystallization.

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